From taxonomic deflation to newly detected cryptic species: Hidden diversity in a widespread African squeaker catfish

Dagmar Jirsová[1,2]*, Jan Štefka[1,2], Radim Blažek[3,4], John O. Malala[5], David E. Lotuliakou[5], Zuheir N. Mahmoud[6], Miloslav Jirků[2]

Supplementary data

Table S1. Sequences of *coxI*, *cytb* and *RAG2* for *Synodontis* spp. from the Nile and Turkana deposited in GenBank, including detailed information on localities. Data provided in separate file.

Table S2. List of GenBank *coxI*, *cytb* and *RAG2* *Synodontis* spp. sequences used in phylogenetic and haplotype analyses Data provided in separate file. The data obtained from the same sample are highlighted by bold.

Table S3. Results of chi-square test for spatial distribution of *S. schall*, *S. frontosus* and intermediate morphotypes.

obs.	El Molo	Kalokol	Todonyang	totals(marginals)
1	35	19	32	86
2	16	11	31	58
3	7	0	14	21
	58	30	77	165

obs. frekv.	El Molo	Kalokol	Todonyang	null (expected)
1	0,603	0,63	0,415	0,52
2	0,276	0,36	0,402	0,35
3	0,121	0	0,181	0,13

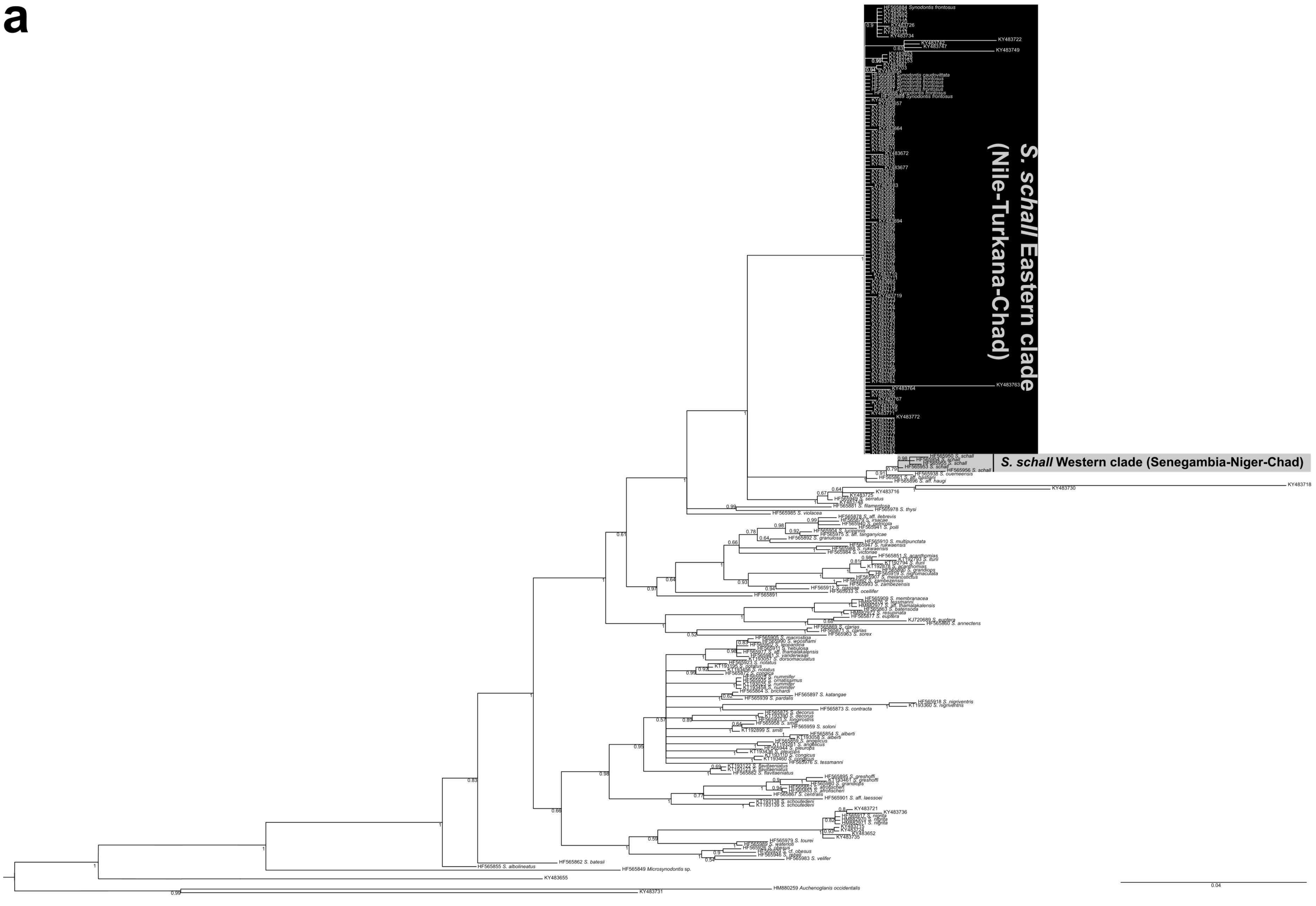
expected counts	El Molo	Kalokol	Todonyang
1	30,23	15,63	40,13
2	20,38	10,54	27,06
3	7,38	3,81	9,8

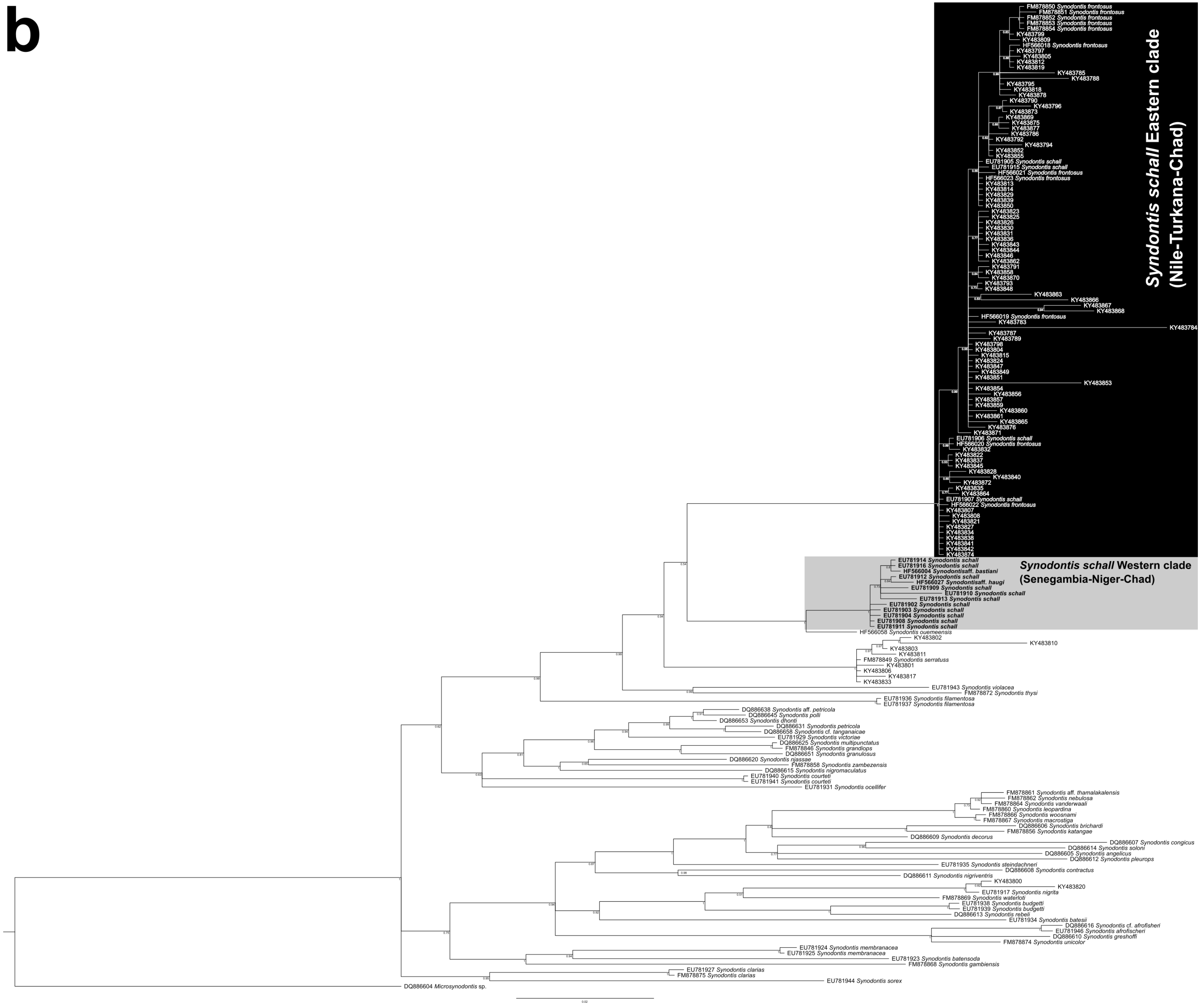
	El Molo	Kalokol	Todonyang	
χ2	0,753	0,723	1,648	
	0,944	0,019	0,571	
	0,019	3,818	1,8	
	1,716	4,561	4,019	**10,297**
P(=0,05; df=4)	**9,488**			

Table S4. Results of population genetics analyses between *S. schall*-like and *S. frontosus*-like morphotype from Eastern Africa (the Nile and Turkana) obtained for this study. The genetic differentiation between the sequences from three Turkana localities was tested by the *Snn* test and showed that the saline locality differs from the freshwater and medium part.

	Haplotype diversity			
	coxI	*cytb*		
S. schall-like	0.36	0.97		
S. frontosus-like	0.65	0.97		
	Fst			
	coxI	*cytb*		
S. schall-like x *S. frontosus*-like	0.08	0.04		
	Genetic differentiation			
	coxI		*cytb*	
	Chi-square	*P*	*Chi-square*	*P*
S. schall-like x *S. frontosus*-like	34.487	0.0029	51.934	0.1922
	Genetic distance			
	coxI	*cytb*		
S. schall-like	0 - 0.88 %	0 - 1.75%		
S. frontosus-like	0 - 1.06%	0 - 1.95%		
S. schall-like x *S. frontosus*-like	0 - 1.06%	0 - 2.06%		

Turkana localities							
	Haplotype diversity						
	coxI	*cytb*					
Medium salinity	0.38	1.00					
Freshwater	0.40	0.98					
Saline water	0.67	0.93					
	Fst						
	coxI				*cytb*		
	Medium salinity	Freshwater	Saline water		Medium salinity	Freshwater	Saline water
Medium salinity	x			Medium salinity	x		
Freshwater	0.00585	x		Freshwater	0.063	x	
Saline water	0.18779	0.17877	x	Saline water	0.047	0.010	x
	Snn test						
	coxI	*cytb*					
Snn	0.68	0.543					
P-value	0.018	0.094*					
* not significant P-value							


a
S. schall Eastern clade (Nile-Turkana-Chad)
S. schall Western clade (Senegambia-Niger-Chad)
HF565884 Synodontis frontosus
KY483722
KY483749
KY483763
KY483718
KY483730
HF565985 S. violacea
HF565891
HF565862 S. batesii
HF565855 S. albolineatus
HF565849 Microsynodontis sp.
KY483655
HM880259 Auchenoglanis occidentalis
KY483731
0.04


b
Syndontis schall Eastern clade (Nile-Turkana-Chad)
FM878850 Synodontis frontosus
FM878851 Synodontis frontosus
FM878852 Synodontis frontosus
FM878853 Synodontis frontosus
FM878854 Synodontis frontosus
KY483799
KY483809
HF566018 Synodontis frontosus
KY483797
KY483805
KY483812
KY483819
KY483785
KY483788
KY483795
KY483818
KY483878
KY483790
KY483796
KY483873
KY483869
KY483875
KY483877
KY483786
KY483792
KY483794
KY483852
KY483855
EU781905 Synodontis schall
EU781915 Synodontis schall
HF566021 Synodontis frontosus
HF566023 Synodontis frontosus
KY483813
KY483814
KY483829
KY483839
KY483850
KY483823
KY483825
KY483826
KY483830
KY483831
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KY483862
KY483791
KY483858
KY483870
KY483793
KY483848
KY483863
KY483866
KY483867
KY483868
HF566019 Synodontis frontosus
KY483783
KY483784
KY483787
KY483789
KY483798
KY483804
KY483815
KY483824
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KY483853
KY483854
KY483856
KY483857
KY483859
KY483860
KY483861
KY483865
KY483876
KY483871
EU781906 Synodontis schall
HF566020 Synodontis frontosus
KY483832
KY483822
KY483837
KY483845
KY483828
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KY483872
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KY483864
EU781907 Synodontis schall
HF566022 Synodontis frontosus
KY483807
KY483808
KY483821
KY483827
KY483834
KY483838
KY483841
KY483842
KY483874
Synodontis schall Western clade (Senegambia-Niger-Chad)
EU781914 Synodontis schall
EU781916 Synodontis schall
HF566004 Synodontisaff. bastiani
EU781912 Synodontis schall
HF566027 Synodontisaff. haugi
EU781909 Synodontis schall
EU781910 Synodontis schall
EU781913 Synodontis schall
EU781902 Synodontis schall
EU781903 Synodontis schall
EU781904 Synodontis schall
EU781908 Synodontis schall
EU781911 Synodontis schall
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KY483803
KY483811
FM878849 Synodontis serratuss
KY483801
KY483806
KY483817
KY483833
EU781943 Synodontis violacea
FM878872 Synodontis thysi
EU781936 Synodontis filamentosa
EU781937 Synodontis filamentosa
DQ886638 Synodontis aff. petricola
DQ886645 Synodontis polli
DQ886653 Synodontis dhonti
DQ886631 Synodontis petricola
DQ886658 Synodontis cf. tanganaicae
EU781929 Synodontis victoriae
DQ886625 Synodontis multipunctatus
FM878846 Synodontis grandiops
DQ886651 Synodontis granulosus
DQ886620 Synodontis njassae
FM878858 Synodontis zambezensis
DQ886615 Synodontis nigromaculatus
EU781940 Synodontis courteti
EU781941 Synodontis courteti
EU781931 Synodontis ocellifer
FM878861 Synodontis aff. thamalakalensis
FM878862 Synodontis nebulosa
FM878864 Synodontis vanderwaali
FM878860 Synodontis leopardina
FM878866 Synodontis woosnami
FM878867 Synodontis macrostiga
DQ886606 Synodontis brichardi
FM878856 Synodontis katangae
DQ886609 Synodontis decorus
DQ886607 Synodontis congicus
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DQ886611 Synodontis nigriventris
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KY483820
EU781917 Synodontis nigrita
FM878869 Synodontis waterloti
EU781938 Synodontis budgetti
EU781939 Synodontis budgetti
DQ886613 Synodontis rebeli
EU781934 Synodontis batesii
DQ886616 Synodontis cf. afrofisheri
EU781946 Synodontis afrofischeri
DQ886610 Synodontis greshoffi
FM878874 Synodontis unicolor
EU781924 Synodontis membranacea
EU781925 Synodontis membranacea
EU781923 Synodontis batensoda
FM878868 Synodontis gambiensis
EU781927 Synodontis clarias
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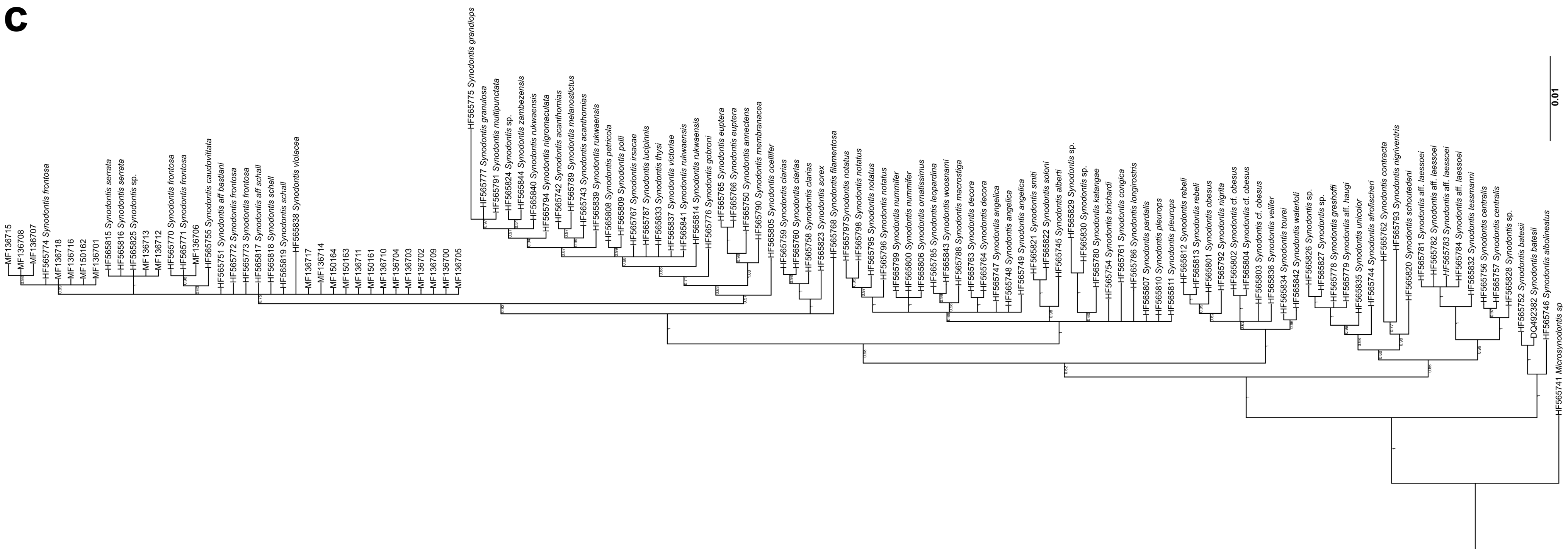
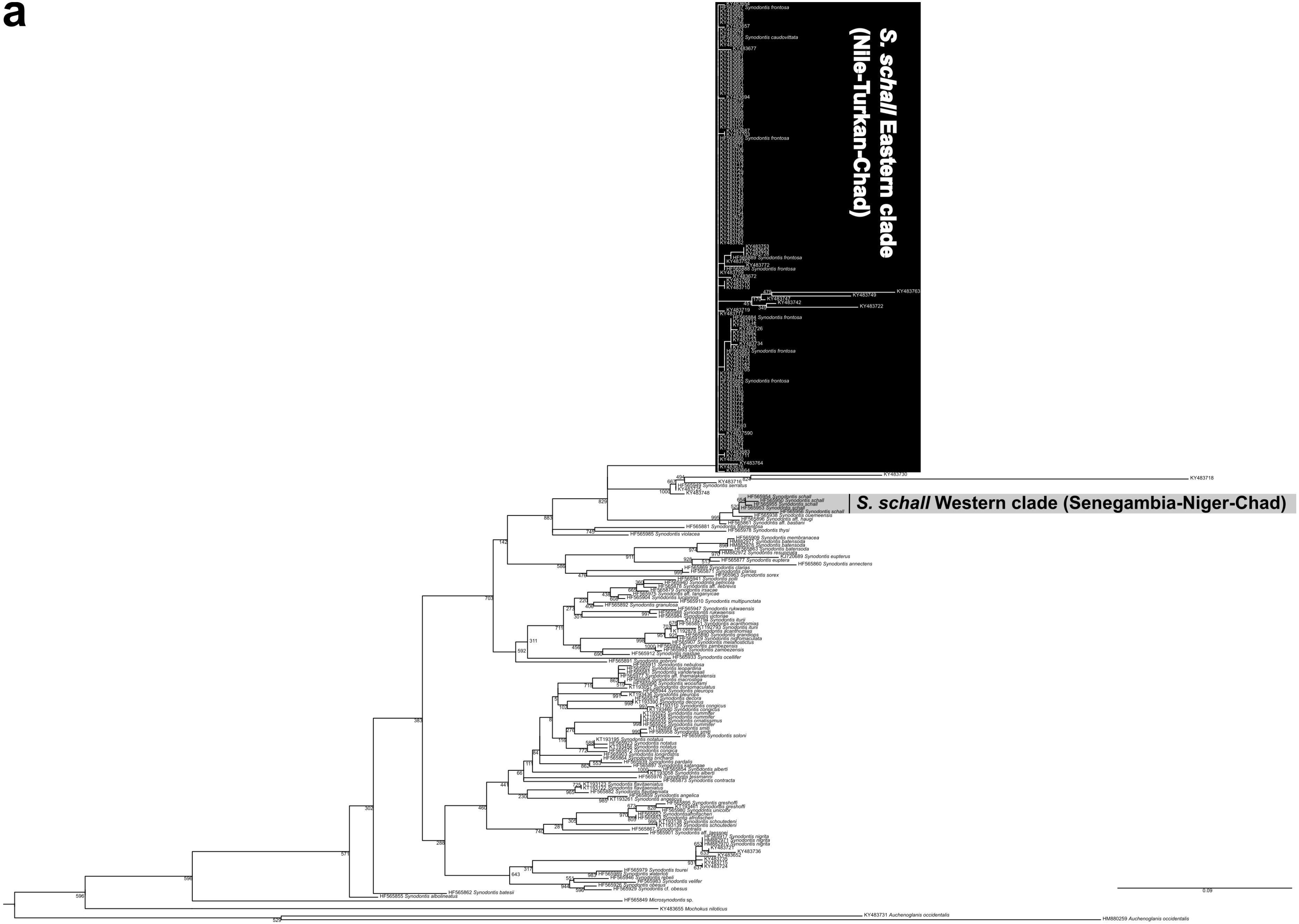


Figure S1. Phylogenetic trees for *coxI* a), *cytb* b) and *RAG2* c) as revealed by BI analyses, showing detailed branching with posterior probabilities as branch supports. Final trees were created by software MrBayes. Sequence data of *S. schall* Eastern clade obtained within the scope of this study are presented with GenBank numbers. Data provided in separate file (see Tab. S2).

a


S. schall Eastern clade (Nile-Turkan-Chad)
S. schall Western clade (Senegambia-Niger-Chad)
0.09
KY483718
KY483730
KY483763
KY483749
KY483722
HF565855 Synodontis albolineatus
HF565862 Synodontis batesii
HF565849 Microsynodontis sp.
KY483655 Mochokus niloticus
KY483731 Auchenoglanis occidentalis
HM880259 Auchenoglanis occidentalis
596
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571
302
383
288
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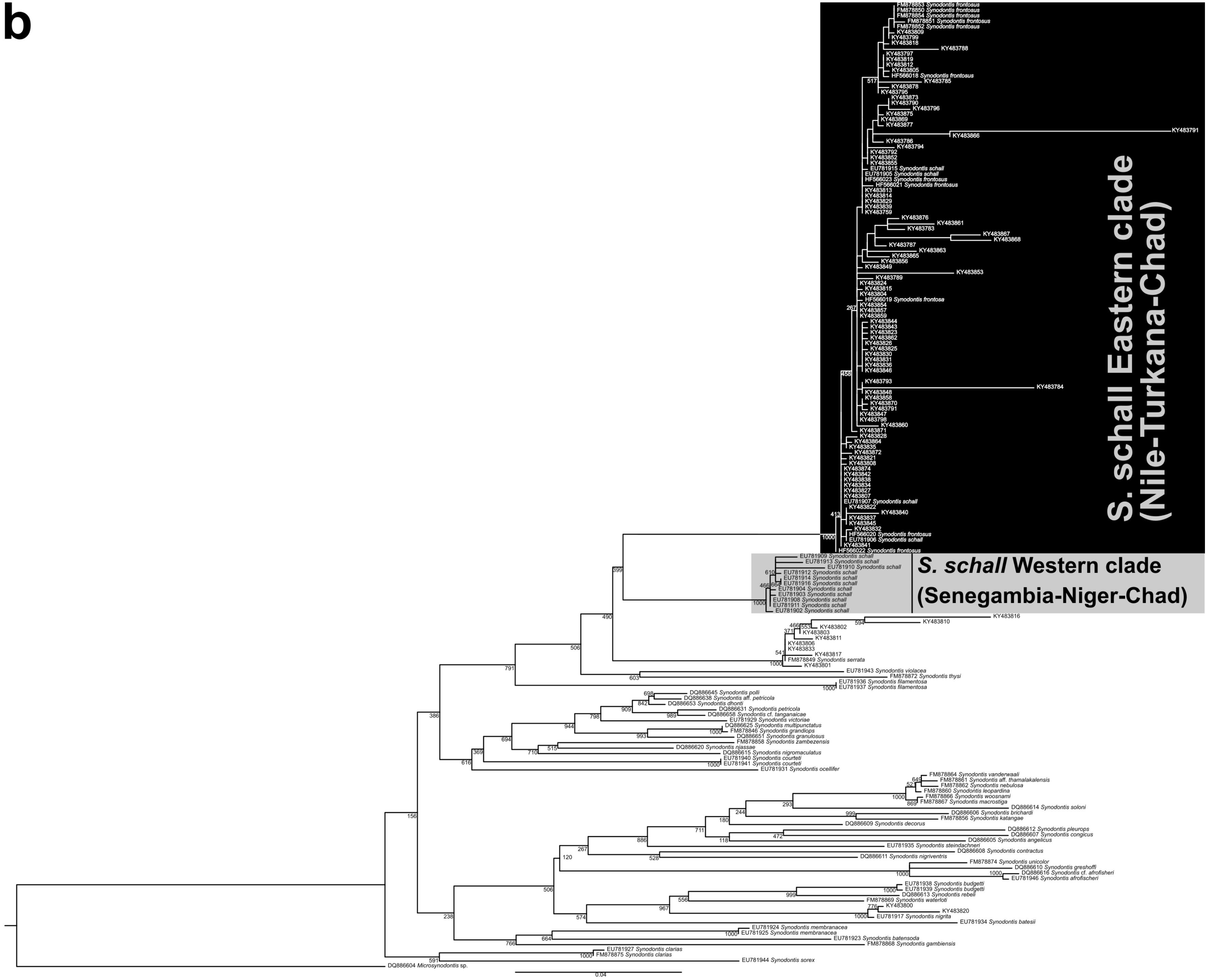
142
883
829


b
FM878853 Synodontis frontosus
FM878850 Synodontis frontosus
FM878854 Synodontis frontosus
FM878851 Synodontis frontosus
FM878852 Synodontis frontosus
KY483809
KY483799
KY483818
KY483788
KY483797
KY483819
KY483812
KY483805
HF566018 Synodontis frontosus
517
KY483785
KY483878
KY483795
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KY483790
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KY483786
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KY483792
KY483852
KY483855
EU781915 Synodontis schall
EU781905 Synodontis schall
HF566023 Synodontis frontosus
HF566021 Synodontis frontosus
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KY483804
HF566019 Synodontis frontosa
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KY483807
EU781907 Synodontis schall
KY483822
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KY483840
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KY483845
KY483832
1000
HF566020 Synodontis frontosus
EU781906 Synodontis schall
KY483841
HF566022 Synodontis frontosus
S. schall Eastern clade
(Nile-Turkana-Chad)
399
EU781909 Synodontis schall
EU781913 Synodontis schall
EU781910 Synodontis schall
610
EU781912 Synodontis schall
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EU781916 Synodontis schall
466
664
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EU781903 Synodontis schall
EU781908 Synodontis schall
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EU781911 Synodontis schall
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S. schall Western clade
(Senegambia-Niger-Chad)
490
KY483816
594
KY483810
466
553
KY483802
371
KY483803
KY483811
KY483806
KY483833
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KY483817
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KY483801
506
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FM878872 Synodontis thysi
EU781936 Synodontis filamentosa
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EU781937 Synodontis filamentosa
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909
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989
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FM878846 Synodontis grandiops
993
DQ886651 Synodontis granulosus
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FM878858 Synodontis zambezensis
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710
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EU781941 Synodontis courteti
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156
244
999
DQ886606 Synodontis brichardi
180
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711
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472
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118
DQ886605 Synodontis angelicus
886
EU781935 Synodontis steindachneri
267
DQ886608 Synodontis contractus
120
528
DQ886611 Synodontis nigriventris
FM878874 Synodontis unicolor
DQ886610 Synodontis greshoffi
1000
1000
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EU781946 Synodontis afrofischeri
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506
1000
EU781939 Synodontis budgetti
999
DQ886613 Synodontis rebeli
556
FM878869 Synodontis waterloti
967
776
KY483800
KY483820
238
574
1000
EU781917 Synodontis nigrita
EU781934 Synodontis batesii
EU781924 Synodontis membranacea
664
1000
EU781925 Synodontis membranacea
766
EU781923 Synodontis batensoda
FM878868 Synodontis gambiensis
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0.04

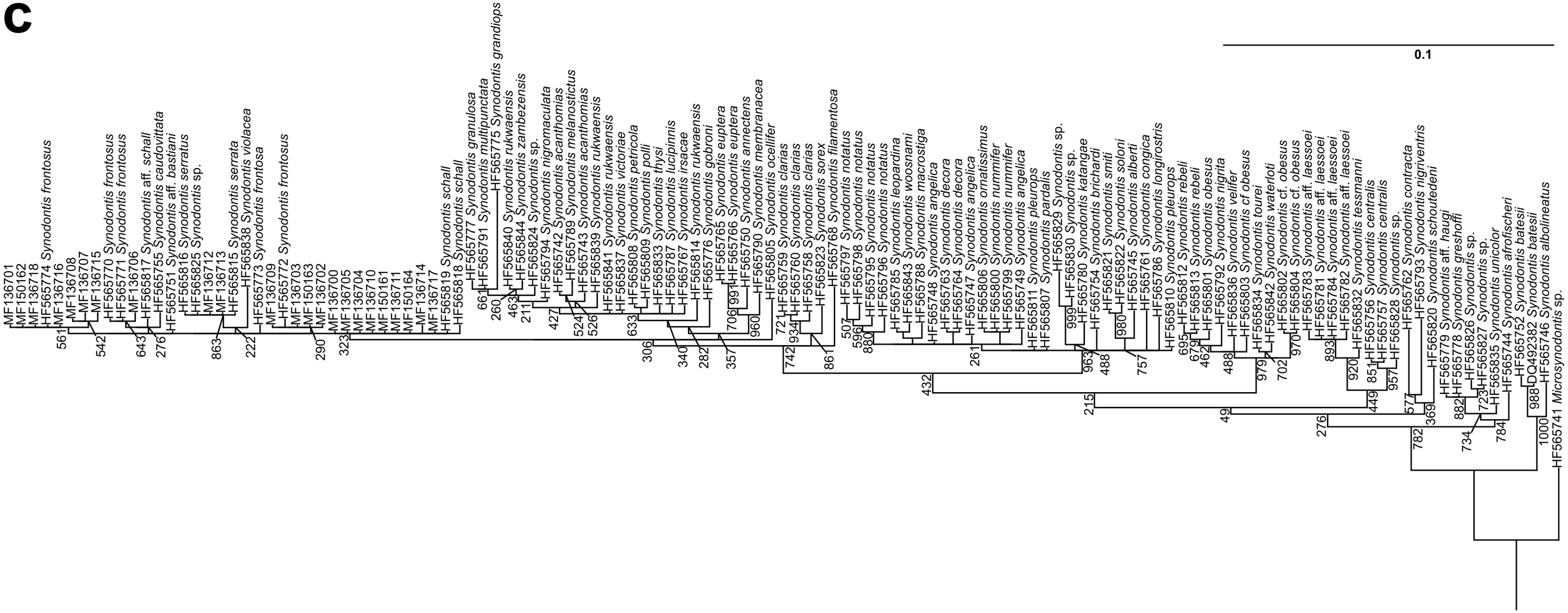

Figure S2. Phylogenetic trees for *coxI* a), *cytb* b) and *RAG2* c) as revealed by ML analyses, showing detailed branching with bootstraps as branch supports. Sequence data of *S. schall* Eastern clade obtained within the scope of this study are presented with GenBank numbers (see Tab. S2).

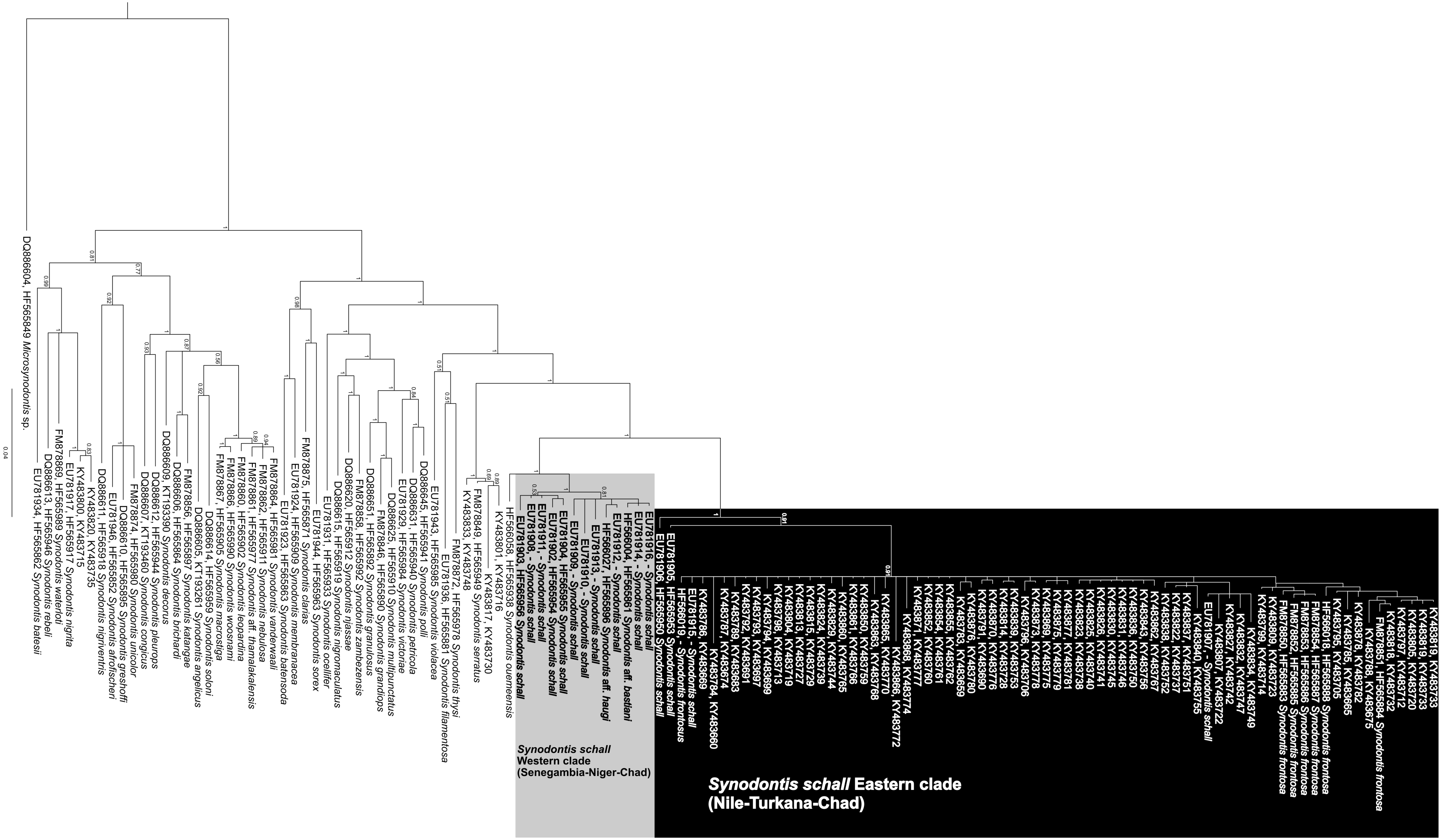

Figure S3. Phylogenetic analysis of concatenated dataset for mt genes (*coxI* and *cytb*) as revealed by BI analyses, showing detailed branching with posterior probabilities as branch supports. Final trees were created by software MrBayes. Sequence data of *S. schall* Eastern clade obtained within the scope of this study are presented with GenBank numbers. Data provided in separate file (see Tab. S1 and S2).

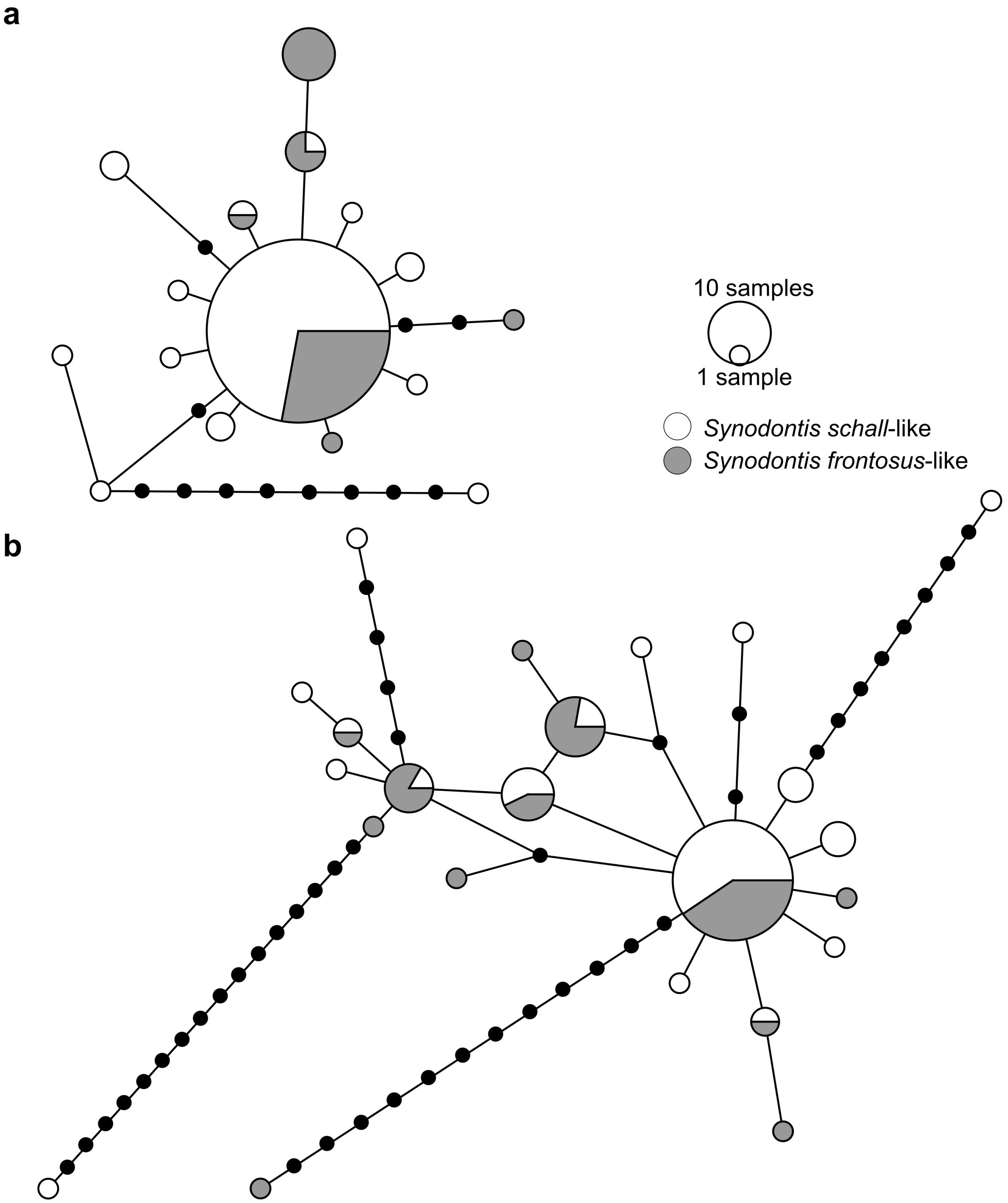

Figure S4. Haplotype networks for *coxI* (a) and *cytb* (b) constructed in software PopART v1.7. Networks were constructed only for samples obtained for this study. Sizes of haplo-nodes are relative to the sample size.